

**REMARKS**

This paper responds to the Office Action mailed August 5 2003.

Claims 1, 3-10 and 12 stand rejected under 35 USC 102(b) as being anticipated by Broeng et al, WO 99/64904 (hereinafter "Broeng PCT"). Claims 1 - 14 stand rejected under 35 USC 102(b) as being anticipated by Broeng et al, US 6 542 681 (hereinafter "Broeng US"), Voevodkin or Komine. Reconsideration is requested.

Claim 1 has been amended to include the features of previous claim 2, which has accordingly been cancelled. Claim 9 has been amended to include the feature of Claim 10 (now cancelled), and Claim 11 has been amended in response to the objection in paragraph 5 of the report.

The invention of amended claim 1 is an optical amplifier design, in which the propagation down the amplifier is one of a discrete number of possible transmission directions for the photons resulting from stimulated emission. This improves the pump efficiency, as the stimulated emissions are concentrated into the direction of propagation down the fiber.

Furthermore, light is also able to be transmitted along a second direction, and this light is able to escape laterally from the photonic band gap structure. In this way, there are a number of propagation directions for spontaneous emission, in particular

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so that a large proportion of the spontaneous emissions can escape from the structure. This improves the noise performance of the amplifier. The stimulated emission will be biased towards the allowed propagation direction down the fiber, because these emissions are stimulated by a signal travelling in the same direction.

The invention thus achieves both improved pump efficiency and noise performance.

Broeng PCT discloses numerous optical fiber designs using photonic band gap structures. The invention of Broeng PCT relates to the separation of high index areas within the photonic band gap structure from low index areas (page 4 lines 15-21). This approach leads to a variety of specific structures disclosed in the application. The emphasis of Broeng PCT is to control the photonic band gaps ("primary gap" and "secondary gap" in Figure 2, see page 39 lines 7 - 9), and there is no discussion of directional control of the propagation of specific frequencies.

Broeng PCT mentions fiber amplifiers in the claims and statements of invention for the "tenth aspect". The only text relating to fiber amplifiers is at page 54 lines 10 – 14.

There is no disclosure or suggestion in Broeng PCT to control the possible transmission directions for stimulated emission frequencies, in order to improve pump efficiency.

Broeng US relates to a design of fiber cladding which is non-symmetrical about the core. Broeng US also discloses various optical fiber designs, but there is again no discussion of directional control of the propagation of different frequencies.

Broeng US also mentions fiber amplifiers only briefly (only at column 6 lines 30-36, column 11 lines 55 – 63 and claims 10 - 15).

There is no disclosure or suggestion in Broeng US to control the possible transmission directions for stimulated emission frequencies, in order to improve pump efficiency.

Komine discloses a single mode fiber laser in which mode filters are used to direct a single mode back into the core (see abstract), while providing greater attenuation of other modes (column 3 lines 44 – 48). The use of photonic band gap structures is mentioned as one way of implementing the filtering function.

There is no disclosure or suggestion in Komine to control the possible transmission directions for stimulated emission frequencies, in order to improve pump efficiency.

Voevodkin relates to a light-emitting fiber, in which photon emission is limited to directions collinear with the fiber core (column 4, lines 24-26). Any spontaneous emission in a fiber amplifier using such a design will therefore also propagate along

the fiber core, and there is no mechanism for the escape of spontaneous emission radiation, as provided by the present invention.

The four references relied upon by the Examiner fail to disclose or suggest the combination of features of amended claim 1, either alone or in combination. The arguments above apply equally to the amended independent method claim, Claim 9.

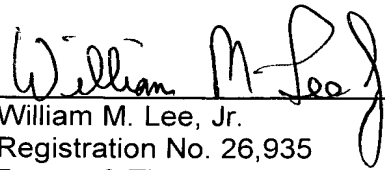
Detailed arguments are not presented in respect of the dependent claims. However, the arguments of the Examiner should not be taken to be accepted.

In view of the arguments above, it is submitted that this application is in order for allowance. Such action is therefore solicited.

Since this response is being submitted during the fourth month following the office action, an appropriate petition for extension of time is also submitted herewith.

December 2, 2003

Respectfully submitted,

  
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